

# Magnetic field induced color change in $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> single crystals

*Monday, 23 July 2012 20:00 (2 hours)*

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We investigated the magneto-optical properties of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> in order to understand the interplay between charge and magnetism in a model transition metal oxide. We discovered that hematite appears more red in applied magnetic field than in zero field conditions, an effect that is amplified by the presence of the spin flop transition. Analysis of the exciton pattern on the edge of the d-d color band reveals C<sub>2</sub>/c monoclinic symmetry in the high field phase. These findings advance our understanding of magnetoelectric coupling away from the static limit and motivate spectroscopic work on other iron-based materials under extreme conditions.

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**Session Classification:** Poster Session 1

**Track Classification:** Spin Phenomena